

Ciliophora, Phyllopharyngea, Discophryidae, *Setodiscophrya steinii* (Claparède and Lachmann, 1859): Range extension and first record from Italy

Ricardo Mariño-Pérez^{1*}, Rosaura Mayén-Estrada¹ and Paolo Fontana²

¹ Universidad Nacional Autónoma de México, Facultad de Ciencias, Departamento de Biología Comparada, Laboratorio de Protozoología. Circuito Exterior s/n, Ciudad Universitaria. 04510. México, DF, Mexico.

² Fondazione Edmund Mach, Istituto Agrario Di San Michele all'Adige. Via Edmund Mach 1, I-38010. San Michele all'Adige, TN, Italy.

* Corresponding author. E-mail: pselliopus@yahoo.com.mx

ABSTRACT: The genus *Setodiscophrya* Jankowski, 1981 has been previously recorded only from Germany, France, Russia, Ukraine and Japan. We provide the new record of *Setodiscophrya steinii* (Claparède and Lachmann, 1859) as an ectosymbiont of *Ochthebius* sp., in the province of Basilicata, Italy which represents the first record of the genus *Setodiscophrya* for Italy and the first worldwide record of *S. steinii* being associated to the coleopteran family Hydraenidae (*Ochthebius* sp.). The range distribution of *S. steinii* is expanded 900 km southwards.

The protozoan suctorids *Setodiscophrya* comprises six species recorded from Germany, France Russia, Ukraine and Japan (Bameul 1991; Dovgal *et al.* 2006). Members of the genus are mainly ectocommensals of imago of aquatic coleopterans for instance *Ochthebius minimus* (Fabricius, 1792), *Hydraena cordata regularis* Rey, 1885, *Hydrophilus aterrimus* (Eschscholtz, 1822) and *Helophorus flavipes* Fabricius, 1792 (*Setodiscophrya deplanata* (Matthes, 1954), *Setodiscophrya hydroi* (Matthes, 1954), *S. steinii* and *Setodiscophrya erlangensis* (Matthes, 1954)) although *Setodiscophrya robusta* (Nosawa, 1938) was found on the snail *Viviparus* sp. and *Setodiscophrya volgensis* Zharikov and Bykova, 2006 as free living (Dovgal *et al.* 2006).

Setodiscophrya steinii (Claparède and Lachmann, 1859) emend. Dovgal *et al.* 2006 is characterized by a rounded or asymmetrical body, laterally flattened. The macronucleus is multibranched. The stalk is massive and expanded upwards in cone form. Numerous clavate tentacles are arranged along body edge except at its part adjoining to stalk. The shapes of stalk and body are extremely variable especially in individuals from elytrae of *Ochthebius* sp.

Differential diagnosis. From *S. hydroi* the species differs by arrangement of the tentacles which are gathered into fascicles, from *S. robusta*, *S. deplanata* and *S. volgensis* by shape of stalk, and from most recently species *S. erlangensis* by arrangement of the tentacles which in the last species are placed only on apical part of the body edge.

Distribution. Water reservoirs of Germany (Matthes 1954).

Hosts. Aquatic coleopterans; *Dytiscus marginalis* Linnaeus, 1758 (type host, indicated by Dovgal *et al.* 2006), *Dytiscus circumflexus* Fabricius, 1801, *Dytiscus semisulcatus* Müller, 1776, *Dytiscus latissimus* Linnaeus, 1758, *Dytiscus dinidiatus* Bergstrasser, 1778, *Platambus maculatus* (Linnaeus, 1758), *Ilybius fenestratus* (Fabricius, 1781), *Colymbetes fuscus* (Linnaeus, 1758), *Cybister lateralimarginalis* (De Geer, 1774), *Rhantus punctatus* Geoffroy, 1785, *Acilius sulcatus* (Linnaeus, 1758),

Graphoderes cinereus (Linnaeus, 1758). All are members of the family Dytiscidae.

Ecology. Found as epibiont of aquatic beetles. Collin (1911) successfully kept the species in laboratory culture. Matthes (1954) testified that the species can inhabit on inanimate substrates. Thus the observations of the species in periphyton are quite possible.

The material was collected in June 2010 at 6 km east of Lago di Monte Cotugno (40°09'55" N, 16°25'12"E. 153 masl.), in the province of Basilicata, Italy. The Monte Cotugno lake (1,850 ha), is an artificial lake formed by the construction, completed in 1983, of the dam of Senise (PZ), which blocks the Sinni river bed and is the largest clay dam in Europe. The lake, created for economic needs, has become important from the perspective of nature. The river Sinni valley is still for almost all its extension characteristic of a broad stream in southern Italy called "fiumara", a river that is characterized by a very broad and stony bed, with plenty of water only during winter and autumn. In this environment, a distinctly Mediterranean flora, is mixed with elements typical of temporary shores and wetlands. The creation of the dam and the formation of Lake Monte Cotugno have brought greater stability to the lifestyles related to water.

The suctorian *S. steinii* was found as ectosymbiont of specimens of the aquatic coleopteran *Ochthebius* sp. These aquatic insects were found under small rocks in a stream (Figure 1). Ten specimens were collected manually and were fixed in alcohol 70%. In laboratory the specimens of *Ochthebius* sp. were observed under stereoscopic microscope and dissected to isolate the suctorians. In four specimens of *Ochthebius* sp. we found suctorians attached to the body (8, 12, 14 and 14 individuals), mainly at the elytrae but also in the anterior legs. In order to identify the suctorians, they were stained using Harris haematoxylin and were preserved in Canada's balsam (Figure 2). The specimens are deposited in the slide collection of the Laboratorio de Protozoología, Facultad de Ciencias,

Universidad Nacional Autónoma de México.

This is the first record of the genus *Setodiscophrya* from Italy and is the first worldwide record of *S. steinii* being associated with coleopterans of the family Hydraenidae (genus *Ochthebius* sp.). Also the previous record of this suctorian species was in Germany (no precise localities given) and with this new record the range distribution of *S. steinii* is expanded approximately 900 km southwards (considering the southmost point in Germany).

This new record brings new perspectives about the real distribution of the genus *Setodiscophrya*. Also, this is an example that the study of suctorians as ectosymbionts of aquatic insects is poorly known and despite there are complete monographs of the group, most of them are based in very few observations (and localities).



FIGURE 1. Riparian vegetation where the aquatic coleopterans were collected under the small rocks.



FIGURE 2. The suctorian *Setodiscophrya steinii* stained with Harris hematoxylin. Total length 100 µm.

ACKNOWLEDGMENTS: RMP thanks to Dr. Zenón Cano-Santana (Facultad de Ciencias, UNAM) for his support to visit Italy, and to Griselda García-Rivero (Instituto de Biología, UNAM) who kindly identified the aquatic coleopterans. We also thank M. C. Violeta Romero (Instituto de Geología, UNAM) for English improvement. The comments of two anonymous referees improved the final version of this manuscript.

LITERATURE CITED

- Bameul, F. 1991. Note sur deux *Discophrya* phorétiques (Protozoa: Suctoria) trouvés sur des *Hydraena* (Insecta: Coleoptera: Hydraenidae) en Espagne et en France. *Bulletin de la Société Linnéenne de Bordeaux* 19(2): 97-102.
- Collin, B. 1911. Etude monographique sur les Acinétiens. I. Recherches expérimentales sur l'étendue des variations et les facteurs tératogènes. *Archives de Zoologie Expérimentale et Générale* 8(5): 421-497.
- Dovgal, I.V., V.V. Zharikov and S.V. Bykova. 2006. The Systematic Revision of the Genus *Setodiscophrya* (Ciliophora, Suctorea). *Vestnik Zoologii* 40(6): 497-504.
- Matthes, D. 1954. Suktorienstudien II. Über obligatorisch symphorionte *Discophrya*-Arten. *Zoologischer Anzeiger* 152(5-6): 106-121.

RECEIVED: April 2011

LAST REVISED: May 2011

ACCEPTED: May 2011

PUBLISHED ONLINE: July 2011

EDITORIAL RESPONSIBILITY: Inga Ludmila Veitenheimer Mendes